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MOVEMENTS OF BLACK VULTURES BETWEEN COMMUNAL ROOSTS IN FLORIDA

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ABSTRACT.—Communal roosts are important resources for local populations of the Black Vulture (*Coragyps atratus*), but these roosts are increasingly becoming the focus for complaints of wildlife damage. We studied movements of Black Vultures between communal roosts in Florida using mark-resight methods. We marked 416 Black Vultures with patagial tags at two communal roosts in Orange County, Florida. A total of 1,245 resightings of 226 individuals were recorded over a 3-year period. Black Vultures made one-way movements between communal roosts of up to 152 km, and two-way movements (i.e., birds left a site and subsequently returned) between communal roosts of up to 144 km. Patterns of resightings indicated that some Black Vultures use several roosts over wide geographic ranges during parts of their lives. Long distance exchanges between roosts and high nightly turnover of membership at roosts leads to concerns that control of nuisance Black Vulture roosts has the potential to impact nontarget populations in a geographic area well beyond a given communal roost. *Received 1 May 2003, accepted 14 August 2003.*

Communal roosting in birds has attracted the attention of ornithologists for many decades, but no consensus on the origin or function of avian communal roosting behavior has been reached (e.g., Beauchamp 1999, Dall 2002). An interesting example is found in the Black Vulture (*Coragyps atratus*), which roosts year round at persistent communal roost sites (Buckley 1999). Individual Black Vultures appear to derive several benefits from communal roosting, including information exchange (Rabenold 1987a), facilitation of group foraging (Buckley 1996, Stolen 2000), opportunities for social interaction (Stolen 1996), and possible protection from predators (Buckley 1996).

Black Vulture communal roost use is complex, and individuals use communal roosts in different ways during different life stages. For example, nesting adults regularly use the roosts closest to their nest sites, while young adults that no longer receive assistance from their parents often travel more widely among roosts (Rabenold 1987b). Over shorter time spans, individuals do not always return to the communal roost they used the previous evening, and mean nightly turnover at communal roosts as high as 33% has been documented (Rabenold 1987b).

Rabenold (1983) coined the term "roost system" to describe the series of nearby communal roosts used by a local population of Black Vultures in a given area, and found evidence that adults exert control over the membership of communal roosts in the areas near their nesting locations (Rabenold 1986, 1987b). Because most previous research has focused on how individual Black Vultures use roosts within a limited area, little information exists on the movement patterns of Black Vultures between more distant communal roosts. Here we report multiple observations of long distance movements of Black Vultures between communal roosts in Florida. This behavior has not been well documented previously and its occurrence has important implications for the management of nuisance Black Vulture communal roosts.

STUDY AREA AND METHODS

We studied two Black Vulture communal roosts, 12.75 km apart, located near Kissimmee, Osceola County, Florida. The four counties surrounding these roosts were 52% farmland, with 75% of that used as rangeland for cattle (Florida Office of Agricultural Statistics unpubl. data). The island roost was located on a small island, approximately 20 ha, in Bay Lake (28° 25′ N, 81° 34′ W). Several bald cypress (*Taxodium distichum*) trees clustered near one end of the island were used as perches. Birds occasionally roosted in slash pines (*Pinus elliottii*) across the lake (approximately 500 m from the roost trees on the island). The

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conservation area roost was located along Bonnet Creek in a bald cypress and hardwood swamp (28° 19′ N, 81° 31′ W). The roost was several kilometers from paved roads or buildings in an area with limited public access. Roost trees were living bald cypress and several large, dead pines.

We captured Black Vultures at roosts with a walk-in trap that had a funnel-shaped entrance (Bloom 1987). Baiting was conducted for up to three days prior to trapping, and trapping was conducted from sunrise until 6 h after sunrise for up to three days (see Stolen 1996 for details). We marked Black Vultures using patagial wing tags following methods described in Young and Kochert (1987). Tags consisted of 3.5 × 18 cm colored vinyl streamers, secured to the left wing patagium using cattle ear tags of the same color and alphanumeric code. Different colors were assigned to the island and conservation area roosts (orange and green, respectively). Tags could be read from up to 150 m with a 45× spotting scope.

We conducted weekly surveys of the conservation area roost and monthly surveys of the island roost to count vultures and record the presence of tagged individuals. We also solicited information on sightings of tagged birds from local biologists, wildlife officers, and bird watchers using published requests for sightings in ornithological and government newsletters. We reviewed these sightings for accuracy and reliability before including them in analysis. We made opportunistic observations of tagged birds at numerous roosts and other locations throughout central and southwestern Florida. These sites ranged from 8–152 km from the study site roosts. The presence of interested observers at two of these roosts (Orlando Wetlands Park, Orange County, and the Richloam Fish Hatchery, Sumter County, both in Florida) resulted in numerous sightings from these locations.

RESULTS

We tagged 142 Black Vultures at the island roost during two trap sessions in 1990, and 274 Black Vultures at the conservation area roost during eight trap sessions between April 1991 and April 1992. We recorded 1,246 resightings of 226 individuals over a 3-year period ending in December 1993. The pattern of resightings at study site roosts showed that many of the birds remained in the area and used the study site roosts extensively. Of birds tagged at the island roost, 62% were resighted at least once; most of these birds were seen at the island roost only, although some individuals also were sighted at the conservation area roost or off the study area (Table 1). Of the birds tagged at the conservation area roost, 50% were resighted at least once. In contrast to the pattern at the island roost, the majority of these birds were seen at both roosts. Overall, 53.8% of all birds tagged were resighted at least once and 13.0% were seen at both roosts.

TABLE 1. Over half of 416 Black Vultures tagged during 1990 and 1991 at two communal roosts in central Florida were resighted. Resighting histories are summarized by locations where a bird was resighted (resighting category) and location tagged. Noteable is the large number of resightings at both roosts and off of the study site.

Resighting category	Location tagged[a]			
	Conservation area roost		Island roost	
	Proportion	Number	Proportion	Number
Tagging roost only	0.16	45	0.46	66
Both roosts	0.16	45	0.06	9
Other roost only	0.13	35	0.01	2
Off site only	0.04	11	0.08	11
Total resighted	0.50	136	0.62	88

[a] Total number of birds tagged: conservation area roost = 274, island roost = 142.

Forty-three tagged Black Vultures were resighted at 25 sites away from the study site, ranging 8–152 km from the tagging location, including 25 from among birds tagged at the island roost and 18 from among birds tagged at the conservation area roost (Fig. 1). Many of these distant sightings were made at communal roosts (Table 2). Ten of the tagged Black Vultures observed at a distant roost location were subsequently resighted on the study area, including five that were tagged at each roost. These birds were observed at five different distant roosts ranging from 58–144 km from the location of tagging (Fig. 1).

In addition to sightings of the birds we tagged, 24 Black Vultures tagged at other communal roosts in Florida by R. L. Thompson of the USDA Animal Control Office (R. L. Thompson pers. comm.) were observed at

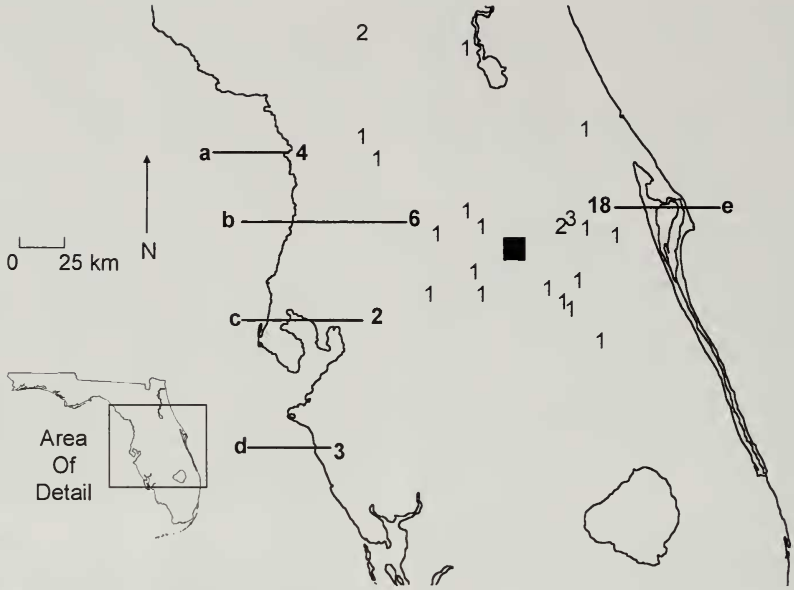

FIG. 1. Locations of 57 distant sightings of tagged Black Vultures between 1990 and 1993. Numbers denote the location and the number of tagged birds sighted at each location. Letters show the locations of the five distant roosts at which tagged birds were sighted and subsequently returned to the study area: (a) Homosassa Springs State Park, 1 of 4 birds returned; (b) Richloam Fish Hatchery, 1 of 6 birds returned; (c) Vandenberg Airport, 1 of 2 birds returned; (d) Myakka River State Park, 1 of 3 birds returned; and (e) Orlando Wetlands park, 6 of 18 birds returned. The location of the study site is indicated by a solid square.

the study site roosts and at other locations in central Florida. Eleven of 142 birds tagged at a roost 10 km from the study site were resighted at a study site roost. Two Black Vultures tagged at a roost at Homosassa Springs State Park (Citrus County, Florida) 109 km distant were resighted on the study site (one at each roost). Six other Black Vultures tagged at Homosassa were resighted at the Richloam Fish Hatchery (Sumter County, Florida), which is 67 km distant. Three Black Vultures tagged at a roost at Lake Marian (Osceola County, Florida) 25 km distant, were resighted at study site roosts. One of the three Lake Marian birds also was sighted at the Richloam Fish Hatchery, 52 km from the study site roost and 64 km from the Lake Marian roost. Two other Black Vultures tagged at Lake Marian

TABLE 2. Thirty-eight sightings of Black Vultures tagged during 1990 and 1991 at two roosts in Orange County, Florida, were recorded at roosts at least 25 km distant. Ten of those individuals subsequently were resighted at the study site roost.

		Distance to tagging roost (km)[b]	
Resighting location	Sightings[a]	Island roost	Conservation area roost
Lake Marian, Osceola Co.	1 IR	25	—
Sewage Treatment Plant, Orange Co.	2 IR, 1 CAR	39	37
Orlando Wetlands Park, Orange Co.	8 IR, 10 CAR	59	58
Richloam Fish Hatchery, Sumter Co.	4 IR, 2 CAR	63	56
Vandenberg Airport, Tampa, Hillsborough Co.	1 IR, 1 CAR	90	92
Homosassa Springs State Park, Citrus Co.	4 IR	109	—
Wauberg Lake, Alachua Co.	2 IR	144	—
Myakka River State Park, Sarasota Co.	2 IR, 1 CAR	144	152

[a] IR = bird tagged at island roost; CAR = bird tagged at conservation area roost.
[b] Distance from the distant roost where sighted to the roost where the bird was tagged.

were resighted at the Richloam Fish Hatchery, and one was sighted at a location in Brevard County, 78 km from the tagging location.

DISCUSSION

Published information on the movement patterns of Black Vultures is limited. In Pennsylvania, Coleman and Fraser (1987) found that the mean distance traveled from communal roosts to feeding sites was 5.6 km (n = 270), and that 95% of daily flight distances were <15 km (Coleman and Fraser 1989). This suggests that Black Vultures may use communal roosts as the center of daily foraging activities. Our repeated sighting of many of the tagged Black Vultures at both study site roosts supports this idea. Other studies have documented long distance movements (170–1,152 km) of Black Vultures from locations where they were marked (Parmalee 1954, Parmalee and Parmalee 1967, Rabenold 1983, Sweeney and Fraser 1986). Because the majority of these distant sightings were made away from communal roosts, they do not shed much light on Black Vulture communal roosting behavior. One exception was reported by Sweeny and Fraser (1986), who observed a Black Vulture at a roost 190 km from where it was tagged.

A significant finding of our study was that Black Vultures routinely travel to distant communal roosts up to 152 km away. Our results also document that Black Vultures often return to a communal roost following visits to distant communal roosts. These movements, occurring at distances ranging 61–152 km from the original tagging locations, have not been well documented previously for the Black Vulture. Two lines of evidence indicate that Black Vultures in Florida routinely use distant communal roosts. First, birds tagged at both study site communal roosts demonstrated this behavior. Second, birds tagged at two other communal roosts in central Florida also were observed moving between distant roosts. Thus, movement of birds between local roost systems occurred in both directions. By documenting the extensive use of distant roost locations by tagged Black Vultures, our results suggest that local populations of Black Vultures may be connected to other more distant roosts systems.

Communal roosts often are identified at or in the vicinity of complaints of nuisance Black Vultures. Control recommendations often include alteration of the roost habitat, harassment of the birds as they enter the roost in the evening, or translocation or killing of the birds (Lowney 1999). Our results show that efforts to reduce the use of a single Black Vulture communal roost most likely will impact a much larger population of birds than are present at the roost at any given time. Until more is known about the dynamics of Black Vulture communal roost use, management techniques such as habitat modification and harassment for roost dispersal should be used with caution. Because of the high turnover rate of birds at individual roosts, relocation attempts or killing of individuals are not recommended for reducing the numbers of Black Vultures using roosts. We recommend instead that more research be conducted on Black Vulture movement patterns to develop useful management strategies for nuisance vulture roosts.

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